

ADDITIONAL NOTES ON THE GENUS RHAPHITHAMNUS. I

Harold N. Moldenke

A full explanation of the herbarium acronyms herein employed, as in all others of this series of notes in PHYTOLOGIA, will be found in my Fifth Summary 2: 795—801 (1971).

RHAPHITHAMNUS Miers, Trans. Linn. Soc. Lond. Bot. 27: 96. 1870.

Additional synonymy: Poppigia Bertero apud Hook. & Arn., Bot. Beech. Voy., imp. 1, 58. 1832. Poeppigia Bert. ex Spach, Hist. Nat. Veg. Phan. 9: 227. 1840 [not Poeppigia Kunze, 1828, nor Presl, 1830]. Poppigia Hook. & Arn. ex Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 2: 605, in syn. 1894. Raphithamnus Miers ex Dalla Torre & Harms, Gen. Siphonog., imp. 1, 431. 1904. Rhaphithamnus Miers ex Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 486. 1906. Rhaphythamnus Speg., Bol. Acad. Nac. Cienc. Cordoba 25: 51. 1921. Raphitamnus Miers ex Mold., Revist. Sudam. Bot. 6: 27, in syn. 1939. Raphisthamnus Miers ex Mold., Revist. Sudam. Bot. 6: 27, in syn. 1939. Guayunia C. Gay ex Mold. apud Hill & Salisb., Ind. Kew. Suppl. 10: 251, in syn. 1947. Horbleria Pav. ex Mold. apud Hill & Salisb., Ind. Kew. Suppl. 10: 251, in syn. 1947. Volkaria A. Juss. ex Acevedo de Vargas, Bol. Mus. Nac. Hist. Nat. Chile 25: 48, in syn. 1951. Raphithamnus Herter, Revist. Sudam. Bot. 10: 260. 1956. Raphithamnus Dalla Torre & Harms ex Airy Shaw in J. C. Willis, Dict. Flow. Pl., ed. 7, 953, in syn. 1966. Rhaphitamnus B. D. Jacks. ex Airy Shaw in J. C. Willis, Dict. Flow. Pl., ed. 7, 989, in syn. 1973. Poeppigia "Bert. ex Fer." apud Troncoso, Darwiniana 18: 411, in syn. 1974. Rhaphidothamnus Phil., in herb.

Bibliography: Pers., Syn. Pl. 1: 201 (1805) and 2: 144. 1806; A. L. Juss., Ann. Mus. Hist. Nat. Paris 7: 76. 1806; Lam., Encycl. Méth. Bot. 8: 691. 1808; Pers., Sp. Pl. 3: 363. 1819; Miers, Trav. Chil. La Plat. 2: 530. 1826; Reichenb., Conspect. 212a. 1828; Dumort., Anal. Fam. Pl. 22. 1829; Bartling, Ord. Nat. Pl. 180. 1830; Bert., Bull. Sci. Nat. Férussac. 23: 109. 1830; Presl, Symb. Bot. 1: 15, pl. 8. 1830; Hook. & Arn., Bot. Beech. Voy., imp. 1, 42 (1830) and imp. 1, 58, pl. 11. 1832; Lindl., Nat. Syst. Bot., ed. 2, 278. 1836; Endl., Gen. Pl. 633—638. 1838; Benth., Ann. Nat. Hist. 2: 448. 1839; Meisn., Pl. Vasc. Gen. 199 & 290—292. 1840; Spach, Hist. Nat. Vég. Phan. 9: 227. 1840; Hook. & Arn., Bot. Beech. Voy., imp. 1, 475. 1841; Steud., Nom. Bot., ed. 2, 2: 366. 1841; Tulasne, Arch. Mus. Nat. Hist. Paris 4: 120—122. 1844; A. Rich. in Sagra, Hist. Cuba 2 (1): 484. 1845; Walp., Repert. Bot. Syst. 4: 73. 1845; Schau. in A. DC., Prodr. 11: 609—610 & 657. 1847; C. Gay, Hist. Fis. Chil. Bot. 5: 33—35. 1849; Des Murs in C. Gay, Atlas Hist. Fis. Polic.

Chil. 2: pl. [6] sub Zenaida souleyetiana. 1854; R. A. Phil., Bot. Zeit. 14: 646. 1856; R. A. Phil., Fl. Juan Fern. 106. 1857; Buek, Gen. Spec. Syn. Candoll. 3: 104 & 503. 1858; Bocq., Adansonia, ser. 1, 2: 157 (1862) and ser. 1, 3: 223. 1863; Bocq., Rév. Verbenac. 157 & 223. 1863; Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 207. 1863; Miers, Trans. Linn. Soc. Lond. 27: 95--100 & 108, pl. 26. 1870; Benth. in Benth. Hook. f., Gen. Pl. 2: 1132--1136. 1876; F. Phil., Journ. Bot. Lond. 22: 209 & 210. 1884; Hook., Curtis Bot. Mag. 3: pl. 6849. 1885; Vesque, Ann. Sci. Nat. Paris, sér. 7, 1: 341. 1385; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 550. 1893; Briq. in Engl. & Prantl, Nat. Pflanzenfam., ed. 1, 4 (3a): 144 & 159. 1894; Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 2: 704 & 1219. 1895; Estud. Fl. Islas Juan Fernand. 15 & 22. 1896; R. A. Phil., Anal. Univ. Chile 90: 624. 1896; Speg., An. Soc. Cient. Argent. 48: [Nov. Add. 1:] 242. 1902; Dalla Torre & Harms, Gen. Siphonog., imp. 1, 431. 1904; Macloskie in W. B. Scott, Rep. Princeton Univ. Exped. Patag. 8 (2): 681 & 693--694. 1905; Durand & Jacks., Ind. Kew. Suppl. 1, imp. 1, 486. 1906; Dalla Torre & Harms, Gen. Siphonog., imp. 1, 864. 1907; Reiche & Phil., Fl. Chil. 5: 272 & 305--306. 1910; M. Kunz, Anatom. Untersuch. Verb. 67--68. 1911; C. K. Schneid., Ill. Handb. Laubholz. 2: 590. 1911; Gilg in Engl., Syllab. Pflanzenfam., ed. 7, 314, fig. 413 G. 1912; Gandoger, Bull. Soc. Bot. France 60: 25. 1915; B. L. Robinson, Proc. Am. Acad. 51: 531. 1916; Skotts., K. Svensk. Vetensk. Handl. 56 (5): 293. 1916; Rivera, Estud. Fl. Bosq. Fray Jorge 17. 1917; Fedde & Schust., Justs Bot. Jahresber. 41: 387. 1918; Gilg in Engl., Syllab. Pflanzenfam., ed. 8, 318, fig. 413 G. 1919; Jaffuel & Pirion, Revist. Chil. Hist. Nat. 25: 387. 1921; Prain, Ind. Kew. Suppl. 5, imp. 1, 215. 1921; Speg., Bol. Acad. Nac. Cienc. Cordoba 25: 51 & 97. 1921; Skotts., Nat. Hist. Juan Fernand. 2 (2): 163. 1922; Wangerin, Justs Bot. Jahresber. 51 (1): 555. 1923; Gilg in Engl., Syllab. Pflanzenfam., ed. 9 & 10, 339, fig. 418 G. 1924; Wangerin, Justs Bot. Jahresber. 46 (1): 368 (1925) and 46 (1): 717 & 718. 1926; Fedde, Justs Bot. Jahresber. 46 (2): 678. 1929; Baeza, Nomb. Vulg. Pl. Silv. Chil., ed. 2, 21, 22, 86, 113, 123, 205, 264, & 265. 1930; F. Phil., Bol. Mus. Nac. Chil. 13: 105. 1930; Petrak, Justs Bot. Jahresber. 49 (2): 313 & 325. 1931; Bonstedt, Pareys Blumengärtn., ed. 1, 272 & 277--278. 1932; Fedde, Justs Bot. Jahresber. 49 (2): 492 (1932) and 51 (2): 353. 1933; Houard, Zoocéd. Pl. Amer. Sud 351. 1933; Contrib. Etud. Peupl. Zool. Bot. Iles Pacif. 4. 1934; Espinosa, Revist. Chil. Hist. Nat. 37: 313. 1934; J. Hutchins., Fam. Flow. Pl., ed. 1, 2: 102. 1934; Junell, Symb. Bot. Upsal. 4: 49--52 & 213--214, fig. 91 & 92. 1934; Urb., Pl. Endem. Chil. 144. 1934; L. H. Bailey, Cat. Florists Handl. Verb. [mss.]. 1935; Skotts., Revist. Chil. Hist. Geogr. 78: 148. 1935; Diels in Engl., Syllab. Pflanzenfam., ed. 11, 339, fig. 432 G. 1936; Hambleton, Rev. Argent. Agron. 3: 171. 1936; Makins, Ident. Trees Shrubs 66 & 259, fig. 54 L. 1936; Mold., Feddes Repert. Spec. Nov. 42: 62--82. 1937; Looser, Rev. Univ. Chile 23: 249. 1938; Mold., Alph. List Common Names 2, 3, 11, 12, 14, 25, & 26. 1939;

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Barkley (1965) mistakenly regards the genera Guayunia and Horbleria as valid — both are straight synonyms of Rhaphithamnus, never validly published under the present Code.

Troncoso (1974) comments that "Las semillas de Rhaphithamnus fueron descritas originariamente (Miers, op. cit. 1869) y por autores posteriores (Briquet, 1897 y Moldenke, 1939) como exalbuminadas. El estudio de las mismas me permitió diferenciar una nítida capa de albumen que rodea al embrión (ver. fig. 29, n). Esta capa es difícil de observar en material seco, de ahí probablemente que dicho carácter haya sido mal interpretado." Her material represented R. spinosus.

Bean (1956) describes the genus as one of "About 10 species of shrubs or trees natives of Chile". Briquet (1894) asserts that there is only "1 formenreiche Art in Chile". I accept two valid species with three subspecific taxa.

RHAPHITHAMNUS SPINOSUS (A. L. Juss.) Mold., Feddes Repert. Spec. Nov. 42: 69. 1937.

Additional & emended synonymy: Volkameria spinosa A. L. Juss., Ann. Mus. Hist. Nat. Paris 7: 76. 1806. Volkameria ramis inferioribus ternis, superioribus oppositis; foliis acuminatis, glabris; floribus solitariis, subsessilibus Lam., Encycl. Méth. Bot. 8: 691. 1808. Duranta umbilicata Miers, Trav. Chile 2: 530, nom.

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C. Gay ex Mold., Feddes Repert. Spec. Nov. 42: 69, in syn. 1937. Pöppigia cyanea Bert. ex Mold., Feddes Repert. Spec. Nov. 42: 69, in syn. 1937. Raphithamnus myrtifolius Miers ex Mold., Feddes Repert. Spec. Nov. 42: 70, in syn. 1937. Raphithamnus pallidus Miers ex Mold., Feddes Repert. Spec. Nov. 42: 70, in syn. 1937. Raphithamnus rotundifolius Miers ex Mold., Feddes Repert. Spec. Nov. 42: 70, in syn. 1937. Volkameria uniflora Dombey ex Mold., Feddes Repert. Spec. Nov. 42: 70, in syn. 1937. Citharexylon cyanocarpa Hook. & Arn. ex Mold., Feddes Repert. Spec. Nov. 42: 69, in syn. 1937; Mold., Prelim. Alph. List Inv. Names 15, in syn. 1940. Citharexylon cyanocarpon Hook. & Arn. ex Mold., Feddes Repert. Spec. Nov. 42: 69, in syn. 1937; Prelim. Alph. List Inv. Names 15, in syn. 1940. Citharexylon cyanocarpum Hook. ex Mold., Feddes Repert. Spec. Nov. 42: 69, in syn. 1937; Prelim. Alph. List Inv. Names 15, in syn. 1940. Citharexylum verticillatum Don ex Mold., Feddes Repert. Spec. Nov. 42: 69, in syn. 1937; Prelim. Alph. List Inv. Names 18, in syn. 1940. Rhaphithamnus cyanocarpus (Bert.) Miers ex Mold., Feddes Repert. Spec. Nov. 42: 69, in syn. 1937; Prelim. Alph. List Inv. Names 39, in syn. 1940. Rhaphithamnus macranthus Gandoger ex Looser, Revist. Univers. Chil., sec. 3 [Cat. Pl. Vasc. Chil.] 23: 249, in syn. 1938. Raphithamnus parvifolius Miers ex Mold., Revist. Sudam. Bot. 6: 28, in syn. 1939. Citharexylon cyanocarpum C. Gay ex Mold., Prelim. Alph. List Inv. Names 15, in syn. 1940. Citharexylon cyanocarpum Schlecht. & Cham. ex Mold., Prelim. Alph. List Inv. Names 15, in syn. 1940. Citharexylon verticillatum Don ex Mold., Prelim. Alph. List Inv. Names 16, in syn. 1940. Rhaphithamnus cyanocarpa (H. & A.) Miers ex Mold., Suppl. List Inv. Names 7, in syn. 1941. Rhaphithamnus coriaceus Miers apud Hill & Salisb., Ind. Kew. Suppl. 10: 193, in syn. 1947. Rhaphithamnus myrtifolius Miers apud Hill & Salisb., Ind. Kew. Suppl. 10: 193, in syn. 1947. Rhaphithamnus pallidus Miers apud Hill & Salisb., Ind. Kew. Suppl. 10: 193, in syn. 1947. Rhaphithamnus rotundifolius Miers apud Hill & Salisb., Ind. Kew. Suppl. 10: 193, in syn. 1947. Volkaria spinosa A. Juss. ex Acevedo de Vargas, Bol. Mus. Nac. Hist. Nat. Chile 25: 48, in syn. 1951. Citharexylum cyanocarpum Hook. ex Mold., Résumé 252, in syn. 1959. Rhaphithamnus cyanocarpus Miers ex Mold., Résumé 342, in syn. 1959. Rhaphithamnus spinosus Walter, Veget. Erde 2: 190. 1968. Rhaphithamnus spinosus var. spinosus Kunkel, Willdenowia 4: 350. 1968. Raphitamnus cyanocarpus Miers ex Mold., Fifth Summ. 2: 616, in syn. 1971. Raphitamnus spinosus (Juss.) Mold., Fifth Summ. 2: 616, in syn. 1971. Raphitamnus spinosus (A. L. Juss.) Mold., Fifth Summ. 2: 616, in syn. 1971. Rhaphithamnus spinosus Mold., Fifth Summ. 2: 617, in syn. 1971. Rhaphitamnus spinosus (A. Juss.) Mold., Phytologia 28: 462, in syn. 1974. Volkameria uniflora Richard, in herb.

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58-669. 1971; Troncoso, Darwiniana 18: [381], fig. 29. 1974.

Recent collectors describe this plant as a shrub or small shrubby tree, 1.5--6 m. tall, many-stemmed, the stems arching, the young stems bristly with axillary spines, the leaves opposite or ternate, handsome, ovate, about 2 cm. long, pointed, entire, lustrous and dark-green above or the "young leaves glossy black-green", the flowers solitary or in pairs in the leaf-axils, 1.5 cm. long, nodding, and the fruit abundant, very decorative, spherical, blue or bright-blue to blue-purple, purplish, or violet, inedible. The corollas are said to have been "pale-blue" by Makins or "blue" by Wall & Sparre as well as on Aravena 18030 and Sparre 2251 & 2908, 13 mm. long and "pale-violet" by Philippi, "light-blue" on Kausel 2599, "clear-blue" on Morrison 17561, "blue-purple" on West 4727, and "white shading to pale-lilac" on West 4553.

Collectors have found the species growing in dense or open sunny woods, by streams in wooded ravines, in littoral or open forests, very wet rainforests, isolated groves, in Myrtaceae and Drimys woods and Nothofagus forests, on dry plains, along roadsides, and in open fields, at altitudes of 10--900 meters, flowering from September to March, fruiting from October to April and July.

Philippi (1856) notes that in this species the fruits are blue, while in R. venustus they are black. Plowman & al. (1971) report that the fruit is used as an antidote for Latua pubiflora poison in Chile. Makins (1936), Eyerdam, and West erroneously refer to the drupaceous fruits as "berries".

Philippi (1896) says that "Gay dice que se árbol; es por lo comun un arbusto ramificado desde la base que alcanza a lo sumo a la altura de 4 metros, i solo en casos escepcionales toma la forma de árbol....Es cierto, que las hojas son en la planta adulta mui enteras 'integerrimi", pero en la planta jóven i en los renuevos son aserradas en la mitad superior del borde."

Encke (1968) describes the species as "immergrüner, fieder-nerviger Sträucher oder Bäume mit glänzenden, fast sitzenden Blättern, kleinen Blüten und auffallenden, beerenartigen Früchten.. in Mittel- und Südchile zu Hause. Er bildet dort kleine, dicht-zweigige Büsche, die dicht mit kleinen, harten, glänzend dunkel-grünen Blättern besetzt sind und schon in der Jugend leicht blühen. Später sitzen sie dicht voll erbsengrosser, hellblauer Früchte." As to its cultivation, he says: "In England winterharter, bei uns [Germany] kleiner Kalthausstrauch, der im Winter mit Temperaturen von 3--10° vorlieb nimmt. Er wird durch Aussaat oder halbreife Stecklinge im Februar oder August bei mässiger Bodenwärme vermehrt. Im übrigen gleicht seine Pflege völlig der von Coprosma etwa."

Bartrum (1968) asserts that R. spinosus was introduced into English gardens by W. Lobb in 1843 and that it is even now grown in Cornwall, Devon, and Sussex. There is a specimen growing against a wall at the Royal Botanic Gardens, Kew, and another has attained tree-like size in a sheltered middle Sussex garden. Bailey (1935) listed only the Knap Hill Nursery as a source of seeds or plants,

and Mattoon (1958) also lists only a single source. Bean (1956) says that the species "is most satisfactory in the southwest counties [of England] and similar places. Its tenure is insecure in inland places, even against a wall. [It] thrives in loamy soil and is easily propagated by cuttings.... Beautiful in fr[uit]!" Macloskie (1905) avers that "The Indians [=Amerinds of Chile] rub pieces of its wood together in order to strike fire". Miers (1826) comments that it is "Conspicuous for its numerous bright green leaves, accompanied by golden spines and lilac flowers, intermixed with blue shining drupes".

Junell (1934) notes that "Wie sich aus Fig. 91 ergibt, liegt hinsichtlich de Gynäceumbaus grosse Übereinstimmung mit Citharexylum ilicifolium vor. Andererseits liegen aber auch gewisse Verschiedenheiten vor. Die Samenanlagen sind nämlich z.B. basal befestigt, und der Fruchtblattrand ist unter des Samenanlage als Obturator mit langen Drüsenzellen ausgebildet."

Troncoso (1974) has found a small shiny cap of albumen encircling the embryo. She cites as basis for this observation Diem 1705 from Neuquén, Argentina, and Werdermann 55 from San Pedro island, Chiloé, Chile.

Heusser (1971) describes the pollen as "monad, isopolar, radio-symmetric; tricolporate or tetracolporate (stephanocolporate), colpi of moderate length, marked by costae, pores or poroid areas, occurring equatorially, variable in size and definition, their outline somewhat ragged; subprolate, amb circular, subtriangular, or tetragonal; exine ca. 1.5  $\mu$  thick, tectate, columellae distinct, tectum foveolate; 55--82 x 48--67  $\mu$ ", based on Jiles P. SGO.57572.

Gibbs (1974) reports the HCl/methanol test negative, cyanogenesis absent from the leaves, and syringin doubtfully present. Spegazzini (1921) reports it as host to the parasitic fungi, Phyllosticta raphithamni and Rosellinia costesi. Veblen & Ashton (1978) report it as among the shrubs that took part in a mass movement into the forests due to earthquakes in the Andes of south-central Chile in 1960.

The following vernacular names have been reported: "amyán macho", "arayan de espino", "arrayán de espino", "arrayán espinudo", "arrayan macho", "arrayán macho", "arroyon espinado", "blaufrüchtiger Nadelstrauch", "chaguis", "common prickly-myrtle", "espinillo", "espino", "espino blanco", "espino negro", "guayun", "haumun", "hayún", "huayun", "nayún", "prickly-myrtle", "repu", "repu mayún", and "white thorn".

The type of Volkameria uniflora, listed in the synonymy above, is Dombey s.n. in the Richard herbarium at Paris.

There has been much discussion about the supposed occurrence of R. spinosus in Peru. In my original monograph of the genus in 1937 I cited an A. Cunningham s.n. collection at Kew from Port Laguna, Lambayeque, collected on November 25, 1868. Soukup (1954) says "De las tres Lagunas existentes en el dept. Lambeyeque, se trata de Lagunas, pueblito que no pasa de 200 almas situado en la

proximidad de la desembocadura del río Saña. A primera vista la vegetación demuestra que se trata del típico monte ribereño del Dr. Weberbauer. La búsqueda entre la actual carretera y el mar fue completamente estéril. El Rhaphithamnus exige bastante humedad que por cierto no encontrará en Lagunas. Para aclarar más el se interesante problema solicité la ayuda del Secretario de la Academia Chilena de Hist. Nat. de Chile, Sr. Gualterio Looser. Este pudo examinar el libro de Cunningham: Notes on the natural history of the Strait of Magellan and west coast of Patagonia made during the voyage of H. M. S. 'Nassau' in the years 1866, 67, 68, & 69. Edimburgo 1871. Según se desprende de la lectura del libro se puede afirmar: 1) Que Cunningham, por lo menos en mencionado año por la papeleta, no estuvo en el Perú. De Inglaterra se vinieron por el Atlántico hasta el estrecho de Magallanes y la Patagonia occidental chilena, sin seguir más el norte. Después regresaron a Europa por el estrecho. 2) Que en Chile, no lejos del estrecho de Magallanes existe un Puerto (o Port.) Laguna. Allí estuvo Cunningham, allí abunda de la especie en mención y Cunningham lo cita con el nombre Citharexylon cyanocarpum. De los expuesto se puede creer que Rhaphithamnus spinosus no crece en el Perú y que la localidad mencionada es error de la papelita." Macbride (1960), however, asserts that R. spinosus "probably" occurs in Tacna "since probably collected in Arica", Chile.

A letter to me from my longtime friend, Gualterio Looser, dated January 25, 1940, states, in part: "Fray Jorge: Se trata de una localidad el 'bosque de Fray Jorge' situado en la desembocadura del río Limarí, 30°45' lat. austral, en el litoral de Océano Pacífico (provincia de Coquimbo, Chile). No estoy en situación de mencionarle en el momento ejemplares de herbario de Rhaphithamnus spinosus coleccionados en ese lugar, porque los 2 principales herbarios de Santiago, están momentáneamente cerrados por ser época de vacaciones. Yo no tengo ejemplares de ese lugar, porque no lo he visitado. Pero la presencia de la especie mencionada en el bosque de Fray Jorge, es absolutamente segura, como lo prueban las citas siguientes en los trabajos de Federico Philippi: Una visita al bosque más boreal de Chile -- Boletín Museo Nac. de Chile 13: 96--109. 1930. Esta trabajo es una traducción de un artículo en inglés publicado originariamente en The Journal of Botany, London, July 1884, vol. 32: 202--211. En la traducción el pasaje sobre Rhaphithamnus está en la p. 105 y está mencionado bajo el nombre de Citharexylon cyanocarpum H. & Arn.

"Otro botánico que cita esta especie de Fray Jorge es Álvaro Rivera Matte en su trabajo 'Estudios sobre la flora del bosque de Fray Jorge' 27 pp., Santiago 1917. El pasaje sobre el Rhaphithamnus está en la p. 17.

"Por lo demás Ud., tácitamente, cita también esta localidad en sus trabajos, porque menciona la especie de la prov. de 'Coquimbo'. El bosque de Fray Jorge está en la provincia de Coquimbo y es el único punto de esa región, donde puede crecer el Rhaphithamnus.

"El bosque de Fray Jorge es una localidad famosa en la botánica Chilena, pues es un bosque 'relict' de la notohile subantártica y de carácter netamente higrófilo en medio de la vegetación muy xerófila y subdesértica del resto de la provincia de Coquimbo. En Fray Jorge debido a ciertas circunstancias topográficas y a abundantísimas neblinas que se levantan del océano, se ha conservado una flora con numerosos elementos subantárticos como Hymenophyllum, Asplenium magellanicum, Aetoxicum punctatum, etc., mientras que muchas de estas especies de carácter austral, no vuelven a encontrarse en todo Chile central, sino mucho más al sur, habiendo unhueco de varios centenares de kilómetros entre Fray Jorge y la estación más próxima.

"Como he dicho, la presencia de Rhaphithamnus spinosus en Fray Jorge, es absolutamente segura y además es el límite boreal. Hacia el norte sigue un largo desierto por toda la costa del Pacífico hasta cerce de Guayaquil en la República del Ecuador.

"Por todas estas consideraciones, creo sumamente dudosa la presencia de Rhaphithamnus spinosus en la costa del N. del Perú (Lambayeque) que Ud. cita.....y también, pero sin localidad determinada en Revista Sudamericana de Bot.....Creo que ese ejemplar de Dombey que Ud. menciona estará mal etiquetado y que probablemente lo habrá coleccionado en el sur de Chile, donde también anduvo. En la colecciones antiguas de plantas chilenas y peruanas hay numerosos errores, particularmente en las colecciones de Neé, Dombey, Haenke y otros."

In a letter to me dated August 5, 1940, Looser says "Refiriéndome a una de mis anteriores, copio al pié de la letra las etiquetas de los dos ejemplares más boreales de Rhaphithamnus spinosus (A. L. Juss.) Moldenke que se encuentran en el herbario del Museo Nacional de Historia Natural de Santiago y que fueron examinados por mí.

"1°. Rhaphidothamnus (sic G. L.)

Fray Jorge 30.1.83

ejemplar estéril sin nombre del colector, la etiqueta es da letra de R. A. Philippi. Fray Jorge es la localidad a que ya me ha referido en mis anteriores, situada en la provincia de Coquimbo. El coleccionista fué probablemente Federico Philippi. Cfr. el trabajo de ésta citado en mis anteriores.

"2°. Citharexylon cyanocarpum

Hook. et Arn.

Cuesta del Melon Sept. 1865

sin nombre del colector, letra de la etiqueta de R. A. Philippi. La Cuesta del Melón está en el límite de las provincias del Valparaíso y Aconcagua, más o menos a 32°35' lat. austral."

Looser also writes me that the Lechler "520a", cited by me in my monograph as from Arica, Chile, is actually from Arique in Valdivia province (lat. 39°), as is confirmed by the Stockholm specimen. Since it now seems definitely established that Fray Jorge (lat. 30°) is the northernmost station for this species and that specimens labeled and/or cited from Arica and from Peru are

actually not from those areas, Macbride's supposition that it occurs in Tacna must also be discounted.

Additional & emended citations: CHILE: Aconcagua: Bertero 1258 (F--869051); Kausel 2599 (Lg, N). Arauco: Aravena 10 (Ca--86128); Eights 11 (W--920016). Cautín: Claude-Joseph 596 (W--1057666), 4305 (W--1284493), 4836 (W--1343757, W--1421529); Kausel 4836 (S); Kunkel 101 (Z); Sparre 3191 (S), 3409 (S), 3428 (S), 3486 (S). Chiloé: Junge 57 (Mu), 71 [52] (B); Landrum 874 (Mi); Morrison 17561 (Ba, Ca--633090); Sparre 4441 (S). Concepción: Junge 2061 (Ba, Ug--8591); Rufz & Pavon s.n. (F--842447). Coquimbo: Ellenberg 4674a (Ac); Jiles 1688 (S); Sparre 2908 (S). Llanquihue: Erlanson & MacMillan 21 (W--1544751); Ljungner 1128 (Go), 1129 (Go); Looser 4000 (N); Flowman 2610 (Oa); Shannon & Shannon 37 (W--1544453); Skog 1082 (W--2705195); Sparre 3762 (S), 3904 (S), 4229 (S), 4273 (S), 4380 (S), 4527 (S); Wall & Sparre 23 (S), s.n. [14/1/47] (Ew), s.n. [16/1/47] (Ew, Ew); Werdermann 55 (Ca--238428, E--909970, F--549178, W--1233067); Yunge 52 (E--1028959). Magellanes: Cunningham s.n. [Port Laguna, Nov. 25, 1868] (K). Malleco: Sparre 3325 (S), 5142 (S). Valdivia: Aravena 18030 (Ca--665930); Beku 1181 (Ca--498615, E--1029342); Boelcke 223 (N); Buchtien s.n. [1896] (W--1177979), s.n. [Valdivia, 24.X.1904] (La, Vt, Ws); Eyerdam 10686 (W--2372168); Gunckel 84 (F--633777), 2442 (Ca--483155, E--1022708); H. Krause s.n. [Coral] (W--1690243); Lechler 520 ["520a"] (Bm, K, Ol, P, S, Us, V, X); R. A. Philippi 1294 (W--1323228), 1295 (W--1323229), s.n. [Jan. 1883] (F--640015), s.n. [San Juan] (W--616686), s.n. (Vt); Sargent s.n. [23.I.1906] (E--118669); Sparre 2251 (Ew), 4648 (S); E. Wall 23 [19/1/47] (Ew). Valparaíso: Claude-Joseph 3632 (W--1283456); Looser 3999 (N); Moldenke & Moldenke 19765 (Es, Lg, Mg, Mr, N, N, No, Ot, S, Sm); C. Skottsberg s.n. [10/4/1955] (S); J. West 4553 (Ca--561654); Wilkes, U. S. Expl. Exped. s.n. [Valparaíso] (W--58255); Zöllner 7829 (Ld). Mocha Island: Kunkel M.11 (Mu, Z). San Pedro Island: Werdermann 55 (Gg--34508). Talcán Island: Marticorena 1743 (Ac). Province undetermined: Claude-Joseph 2374 (W--1189126); Cuming s.n. (F--871235); Dombey 250 ["Perou"] (B--cotype, Cb--cotype, Dc--cotype, Le--cotype, P--cotype, P--cotype, P--cotype, P--cotype, P--cotype), s.n. ["Perou"; Herb. A. L. Jussieu 5025] (B--cotype, B--cotype, B--cotype, B--cotype, B--cotype, B--cotype, B--cotype, F--cotype, N--cotype, N--cotype, P--cotype); Pavon s.n. ["Perou"] (Cb), s.n. [Volk. unifl.] (N). ARGENTINA: Chubut: Burkart 19801 (N); A. Castellanos s.n. [Herb. Inst. Miguel Lillo 118405] (Gg--406034, S), s.n. [Herb. Inst. Miguel Lillo 118406] (S). Río Negro: Cordini s.n. [18.IX.1928] (W--1617357); J. West 4727 (Ca--562012). CULTIVATED: California: Jerabek s.n. [Golden Gate Park, May 1945] (Sd--47924); Walther 44 (Gg--170536), s.n. [Golden Gate

Park, March 1932] (Gg--193157). England: Rehder s.n. [Arb. Kew. March 1898] (Ur). LOCALITY OF COLLECTION UNDETERMINED: Collector undetermined s.n. (Z--photo); Herb. Canby s.n. [S. America] (Pa).

**RHAPHITHAMNUS SPINOSUS f. ALBIFLORUS** Kunkel, Willdenowia 4: 351. 1968.

Synonymy: Rhaphithamnus spinosus f. albiflora Kunkel ex Mold., Résumé Suppl. 17: 12, in syn. 1968.

Bibliography: Kunkel, Willdenowia 4: 351 & 352. 1968; Mold., Résumé Suppl. 17: 3 & 12. 1968; Mold., Fifth Summ. 1: 194 (1971) and 2: 617 & 906. 1971.

This form differs from the typical form of the species only in having pure white corollas. It is based on Kunkel s.n. from "Lumaco/Chile; Fundo Santa Clara", apparently in the province of Malleco, Chile, collected on October 26, 1958, and deposited at Berlin. Kunkel (1968) comments that "Die Form unterscheidet sich vom typischen R. spinosus (lila-blühend) durch die rein weisse Farbe der Blüten". It is not known from Mocha island as was previously erroneously reported by me.

Citations: CHILE: Malleco: Kunkel s.n. [26.X.1958] (Z--isotype).

**RHAPHITHAMNUS SPINOSUS var. INERMIS** Kunkel, Willdenowia 4: 351. 1968.

Synonymy: Rhaphithamnus spinosus f. inermis Kunkel ex Mold., Résumé Suppl. 17: 12, in syn. 1968. Rhaphithamnus spinosus f. pseudospinosus Kunkel ex Mold., Résumé Suppl. 17: 12, in syn. 1968.

Bibliography: Kunkel, Willdenowia 4: 351 & 352. 1968; Mold., Résumé Suppl. 17: 3 & 12. 1968; Mold., Fifth Summ. 1: 194 (1971) and 2: 617 & 906. 1971; Mold., Phytologia 34: 260. 1976.

This variety differs from the typical form of the species in having its branches and branchlets unarmed and is based on Kunkel M.202 from "Bergwald (Grate) am Cerro Pastene und der Laguna, selten", on Mocha island, Chile, collected in October 1958 and deposited in the Berlin herbarium. Kunkel (1968) remarks that "Die Äste und Zweige dieser Varietät sind stachellos und unterscheiden sich dadurch von der stacheligen var. spinosus". It has been found growing at 290 meters altitude and is described as a bush.

Citations: CHILE: Llanquihue: Grau s.n. [14.3.1968] (Mu). Mocha Island: Kunkel M.201 (Z), M.202 (Z--isotype), M.212 (Mu).

**RHAPHITHAMNUS SPINOSUS f. MICROPHYLLUS** Kunkel, Willdenowia 4: 351. 1968.

Synonymy: Rhaphithamnus spinosus f. dentatum Kunkel ex Mold., Résumé Suppl. 17: 12, in syn. 1968. Rhaphithamnus spinosus f. dentatus Kunkel ex Mold., Résumé Suppl. 17: 12, in syn. 1968. Rhaphithamnus spinosus f. microfolius Kunkel ex Mold., Résumé Suppl. 17: 12, in syn. 1968.

Bibliography: Kunkel, Willdenowia 4: 351. 1968; Mold., Résumé Suppl. 17: 3 & 12. 1968; Mold., Fifth Summ. 1: 192 & 194 (1971)

and 2: 617 & 906. 1971.

This form differs from the typical form of the species in its smaller leaves, the blades of which are only 0.8—1 cm. long and 0.3—0.7 cm. wide, the margins dentate. It is based on Kunkel M.199 from Cerro Victoria, at 120 m. altitude, on Mocha island, Chile, collected in October 1958 and deposited in the Berlin herbarium. The corollas are described as "lilac" in color when fresh and the fruit "dark-lilac". It has been collected in flower and fruit in January. Kunkel's proposed (later abandoned) f. dentatus is based on his M.200, also from Mocha island.

Citations: CHILE: Fresia Island: Heins 3064 (N). Mocha Island: Kunkel M.199 (Mu--isotype), M.200 (Z), M.203 (Z).

RHAPHITHAMNUS VENUSTUS (R. A. Phil.) B. L. Robinson, Proc. Amer. Acad. 51: 531. 1916.

Additional & emended synonymy: Citharexylum elegans Phil. apud Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 549. 1893. Citharexylum venustum Phil. apud Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 1: 550. 1893. Rhaphitamnus longiflorus Miers apud Jacks. in Hook. f. & Jacks., Ind. Kew., imp. 1, 2: 704. 1895. Citharexylon venustum Phil. ex Skotts. Nat. Hist. Juan Fernand. 2 (2): 163, in syn. 1922. Raphithamnus venustus (Phil.) Skotts. apud Wangerin, Justs Bot. Jahresber. 51 (1): 555. 1923. Rhaphithamnus venustus B. L. Robinson apud A. W. Hill, Ind. Kew. Suppl. 6: 173. 1926. Rhaphithamnus elegans Deless. ex Hill & Salisb., Ind. Kew. Suppl. 10: 193. 1947. Rhaphithamnus lucidus C. Gay ex Hill & Salisb., Ind. Kew. Suppl. 10: 193. 1947. Rhaphitamnus venustus (R. A. Phil.) B. L. Robinson ex Mold., Phytologia 31: 407, in syn. 1975. Rhaphithamnus venosus Gay, in herb.

Bibliography: R. A. Phil., Bot. Zeit. 14: 646. 1856; R. A. Phil., Fl. Juan Fern. 106. 1857; Miers, Trans. Linn. Soc. Lond. Bot. 27: 98--99. 1970; R. A. Phil., Anal. Univ. Chile 90: 624. 1896; Reiche & Phil., Fl. Chil. 5: 306. 1910; B. L. Robinson, Proc. Amer. Acad. 51: 531. 1916; Skotts., Nat. Hist. Juan Fernand. 2 (2): 163. 1922; Wangerin, Justs Bot. Jahresber. 51 (1): 555. 1923; Baeza, Nomb. Vulg. Pl. Silv., ed. 2, 120 & 265. 1930; Fedde, Justs Bot. Jahresber. 51 (2): 353. 1933; Mold., Feddes Repert. Spec. Nov. 42: 77--82. 1937; Mold., Alph. List Common Vern. Names 3, 11, & 17. 1939; Mold., Geogr. Distrib. Avicenn. 29. 1939; Mold., Revist. Sudam. Bot. 6: 28--29. 1939; Mold., Prelim. Alph. List Inv. Names 15, 26, 36, 39, & 40. 1940; Fedde & Schust., Justs Bot. Jahresber. 60 (2): 574. 1941; Mold., Alph. List Inv. Names 13, 25, 36, 39, & 40. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 42 & 99. 1942; Mold., Alph. List Cit. 1: 46, 51, 98, 190, 244, & 265. 1946; E. H. Walker, Contrib. U. S. Nat. Herb. 30: 402. 1947; Mold., Alph. List Cit. 2: 593 (1948) and 3: 736, 738, 750, 812, 843, 917, & 939. 1949; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 102 & 195. 1949; Acevedo de Vargas, Bol. Mus. Nac. Hist. Nat. Chile 25: 49. 1951; Skotts., Veget. Juan Fern. 827, 835--837,

905, 907, & 912, pl. 59 (2) & 64 (1). 1953; Douin, Ann. Univ. Lyon., ser. 3, C.8: 82. 1954; Skotts., Nat. Hist. Juan Fern. 1: 197, 208, & 377. 1956; Mold., Résumé 122, 253, 255, 297, 336, 342, & 468. 1959; Muñoz Pizarro, Sin. Fl. Chil. 199. 1959; Muñoz Pizarro, Espec. Pl. Descr. Phil. 109. 1960; Goodspeed, Pl. Hunt. Andes 246. 1961; Heusser, Pollen Spores Chile 62, pl. 58-670. 1971; Mold., Fifth Summ. 1: 194, 368, 429, & 431 (1971) and 2: 525, 604, 616, 617, & 906. 1971; Mold., Phytologia 28: 462. 1974; Troncoso, Darwiniana 18: 382 & 411. 1974; Mold., Phytologia 31: 407. 1975.

Illustrations: Skotts., Veget. Juan Fern. 836, fig. 9 a-c, & pl. 59 (2) & 64 (1). 1953; Heusser, Pollen Spores Chile pl. 58-670. 1971.

Recent collectors describe this species as a woody shrub or tree, 1.1-5 m. tall [or "20--30 m." according to Morrison, probably an error for feet], the trunk 5--20 cm. in diameter, spiny, the flowers with much nectar, much visited by hummingbirds, slender, sympetalous, the fruit purple or black, and have found it growing along trailsides in forests and quebradas, in the shade of deep virgin forests, on wooded slopes, and in thickets with Drimys and Fagara, at altitudes of 250--600 meters, flowering from September to May, fruiting in March and December. Solbrig and his associates refer to it as "rare". The corollas are said to have been "purple" on Solbrig & al. 3788 & 3903, "beautiful blue-purple" on Solbrig & al. 3802, "purple-lilac" on Morrison 17334, "violet" on Wagenknecht 18520, "red-violet" on Grandjot & Grandjot s.n., and "RHS Fan 2 Violet 83/A" on Peterson J.1127, while Philippi (1856) refers to them as "dark-violet".

Heusser (1971) describes the pollen of R. venustus as resembling that of R. spinosus "but without a tetracolporate type and appearing most commonly oblate-spheroidal; 53--62 x 50--75  $\mu$ ", based on E. Reed SGO.54860, collected in the Juan Fernandez islands in October of 1872.

Vernacular names reported for this species are "arayan macho", "arrayán macho", "espinillo", "juan bonita", and "juan bueno".

Goodspeed (1961) says that "On Masa Tierra in the brush on the trailside, a few hundred feet up I began to notice fallen flowers of a dark mulberry violet tint. They look extremely odd. Soon we came upon the plant which bore them. It was a tall tree belonging to the Verbena family and is known as Rhaphithamnus venustus. This species, closely related to the espino blanco or 'white thorn' of southern Chile, is the only tree native to the Juan Fernandez islands which has spines."

Skottsberg (1953) gives the following firsthand account of the species in its native haunts: "On both islands, common in the forests of Masatierra, especially on the higher humid slopes and ranging west to the south precipice of Cerro Chumacera. Much less frequent on Masafuera, observed from about 440 to 515 m. A middle-sized tree, 6--8 m tall with trunk to 40 cm in diam. Pl. 59: 2 illustrates an unusually large specimen, a good 10 m tall with the distance to the lowest limb 3 m, and a flattened trunk 46 and 26



cm in diam., respectively, 1.5 m above the ground. Bark often covered with foliaceous lichens. Branchlets slender, pendent (Pl. 64: 1), exposing the dark lilac-coloured flowers. Leaves small, firm, dark green, often attacked by Limacina. The tip of a resting shoot apex in August is seen in Fig. 9 a; bud naked, but densely hirsute, as are the young leaves. In Nov.--Dec. the flowers appear; inflorescence a 2-flowered dichasium, ending in a needle-like spine, which, however, is not always developed (Fig. 9b). Below the inflorescence is a serial accessory leaf-bud. As a rule, growth of the innovations is arrested in March, but they produce new leaves and flowers as late as in April or have stopped growing and end in a bud. Other branches of the same order are several cm long and carry axillary spines and accessory buds, and a second bud, barely visible in the leaf axil, may be present (Fig. 9 c); these spines, which bear 1--2 pair of minute scales, will not carry flowers. In the upper axils no spines had been formed. There is a difference between long vegetative 'prolongation' shoots and short vegetative-floral shoots." He reports that he brought seed back to Sweden and a few of these germinated there in 1919. In October, 1924, two live plants remained, but one of these died soon thereafter without having flowered, nor had the other one, still alive in 1952, flowered by then. The Peterson J.1127, cited below, was taken from cultivated material in California, grown from seeds collected by F. G. Meyer in the Juan Fernandez islands as M.9564. Douin (1954) records the species as cultivated in France. Macbride photographed an isotype of the species in the Vienna herbarium as his type photograph number 34319.

Troncoso (1974) cites R. A. Philippi s.n. [1904; Herb. San Isidro 3477] and M. R. Espinosa 36, both from the Juan Fernandez islands and both deposited in the San Isidro herbarium.

Additional & emended citations: JUAN FERNANDEZ ISLANDS: Masafuera: E. Reed s.n. [1869] (K); Skottsberg & Skottsberg 516 (Go, S, Us). Masatierra: Behn s.n. [14.II.1935] (Ca--657869); Chapin 1083 (Bi, G, N); G. T. Hastings 250 (Ca--66245, It, N, W--530177); Kubitzki 188 (Mu); Morrison 17334 (Ba, Ca--630249, Ew, Se--120458); Pisano & Montaldo 1430 (Ca--7286); Skottsberg & Skottsberg 11 (Bm, Go, K, Ol, P, S, Us, W--1093612), 11b (B, Bi, Bm, Cp, Go, S), 35 (W--2751174), 40 (Go, S, Us), 198 (N--photo, S, Z--photo), 625 (Go, S); Skottsberg & Sparre 287 (W--2751081); Solbrig, Moore, & Walker 3788 (Ba, S, W--2531342), 3802 (Ba, N, S, W--2531321), 3903 (Mi, W--2531344); Wagenknecht 18520 (Ca--656710). Island undetermined: Bertero 1498 (E--118670); Bock 51 (E--112116, F--857098, W--1594199); C. Gay s.n. [Juan Fernandez] (F--998383); Germain s.n. [Herb. Mus. Hist. Nat. Chile 54861] (N--photo); Grandjot & Grandjot s.n. [II.1936] (Mu); R. A. Philippi 788 [Macbride photos 34319] (F--976268--photo of isotype, Kr--photo of isotype, N--photo of isotype, W--photo of isotype). CULTIVATED: Pennsylvania: J. W. Peterson J. 1127 (Ba).